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| APPLICATION NO.               | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/505,262                    | 02/28/2005  | Robert Glynn Lewin   | 9052-203            | 3926             |
| 20792                         | 7590        | 01/21/2010           |                     |                  |
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| RALEIGH, NC 27627             |             |                      |                     |                  |
| EXAMINER                      |             |                      |                     |                  |
| MENDEZ, ZULMARIAM             |             |                      |                     |                  |
| ART UNIT                      |             | PAPER NUMBER         |                     |                  |
| 1795                          |             |                      |                     |                  |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/505,262

**Applicant(s)**

LEWIN ET AL.

**Examiner**

ZULMARIAM MENDEZ

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 December 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SI/22)
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 29, 2009 has been entered.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1, 2, 4, 5, 8-11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dastolfo, Jr. et al. (US Patent no. 5,378,325) in view of Redey et al. (US Patent no. 6,540,902).

With regard to claims 1 and 4, Dastolfo discloses a process and apparatus for the production of metals by the electrolysis of the corresponding metal oxides (col. 3, lines 5-8) comprising: a container having an electrolyte (14) therein; an electrochemical cell (10, figure 1) which comprises: a body or housing/deck; a cathode container (12); and a cathode connector 916); wherein said body or housing/deck is maintained as the cathode (by the metal collector/cathode connector; col. 4, lines 46-48), and said electrochemical cell is free from bolted or screwed fittings (as shown in figures 1-3). Even though Dastolfo fails to explicitly teach wherein the metal oxide is un-dissolved in the bath and the container has spent nuclear fuel therein, he discloses wherein other metal oxides could be used and their corresponding metals recovered using the present invention.

Redey discloses an electrochemical cell in which dissolved and un-dissolved metal oxides can be reduced to their corresponding metals (col. 5, lines 27-34), such as uranium in the processing of spent nuclear fuels in a molten salt (col. 1, lines 11-13; col. 2, lines 27-29). Because both Dastolfo and Redey disclose methods for recovering metals from a metal oxide by electrolysis, it would have been obvious to one skilled in the art to use spent nuclear fuel as the metal oxide source, as taught by Redey, in the process and apparatus for the production of metals by electrolysis of Dastolfo, in order

to achieve the predictable result of reducing the spent nuclear fuel in the molten salt to recover the nuclear fuel as a metal. *KSR v. Teleflex*; see MPEP 2143.

With regard to claim 2, Dastolfo teaches wherein the cathode connector (16) is affixed to an internal surface of the cell (10; figures 1-3).

With regard to claim 5, the electrical connection from the cathode container (12) to the body of the cell/deck provided by cathode connector (16) is provided by means of a press connection (the weight of the deck exerted on the cathode connector (16) as shown in figures 1-2).

With regard to claims 8-10, Dastolfo discloses all of the features, as applied to claim 1 above, but fails to teach wherein the cathode container comprises a mesh basket or metal oxide retaining vessel, wherein the cathode container comprises an assembly of cathode containers and wherein said assembly comprises an assembly of mesh baskets or metal oxide retaining vessels.

Redey discloses an electrochemical cell in which metal oxides can be reduced to their corresponding metals (col. 1, lines 11-13) comprising a cathode assembly (25) wherein the basket cathode/vessel (27) containing the metal oxide to be reduced is constructed from a mesh stainless steel screen material (col. 4, lines 33) in order to enhance conductivity in the system. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention, to add a cathode assembly, as taught by Redey, in the apparatus of Dastolfo, in order to enhance conductivity in the system. Even though Redey does not explicitly disclose having a plurality of cathode containers and mesh baskets or metal oxide retaining vessels, one having ordinary skill

in the art would have found it obvious to add more cathode assemblies in the electrochemical cell in order to be able to perform multiple reactions within the same system (MPEP 2144.04 B; *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960).

With regard to claim 11, Dastolfo discloses wherein the electromechanical cell (10) further comprises a carbon anode (11; col. 3, lines 66-67; col. 6, lines 4-6).

With regard to claim 12, Dastolfo teaches wherein the body or housing of the cell (30; figure 3) is maintained as the cathode (21) by the provision of an electrical connection from a power supply (inherently present in an electrolytic process) to the body or housing (21) of the cell (30; col. 6, lines 49-57).

5. Claims 3, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dastolfo, as applied to claim 2 above, in view of Brown et al. (US Patent no. 6,419,813).

With regard to claims 3, 6 and 7, Dastolfo discloses all of the limitations, as applied to claim 2 above, wherein said cathode connector (16) is affixed to an internal surface of the cell (10) but fails to teach wherein said connector comprises a cathode rail and that such connection is made by means of welding.

Brown discloses an electrolytic cell (2) comprising a cathode (10; figure 2), a cathode connector (16), a cathode rail (22) affixed to an internal surface of the cell (2) by means of welding (col. 4, lines 25-40) in order to maintain a good electrical contact and rigidity. Therefore, one having ordinary skill in the art at the time of the invention would have found it obvious to weld the cathode connector to the internal surface of the cell,

as taught by Brown, in the apparatus of Dastolfo, in order to maintain a good electrical contact and rigidity.

***Response to Arguments***

6. Applicant's arguments filed on December 29, 2009 have been fully considered but they are not persuasive. The applicant argues the following:

- a. The prior art made of record fails to teach or suggest "reduce to metallic form un-dissolved metal oxides...", as amended. In response, this argument has not been found persuasive because Redey teaches wherein the inventive process relies on an electrochemically generated reducing potential at the cathode to reduce the metal-oxide and does not depend on either the generation of a reductant metal or the presence of the soluble species of the metal being produced to accomplish the reduction. In fact, the metal-oxide of interest should only be sparingly soluble or preferably insoluble in the molten electrolyte (col. 5, lines 27-34).
- b. Dastolfo is directed to electrolytic cells wherein the behavior and operation of the cathode is unique to liquid metal cathodes. In response, the examiner does not find this argument persuasive because Dastolfo teaches wherein the electrolytic cell includes a graphite crucible (21) which behaves as a cathode material (col. 7, lines 63-64; figure 3). Therefore, Dastolfo does not limit the cell to contain cathodes in a liquid physical form.

c. The Prior Art made of record fails to teach a cathode container that may be electrically connected to a cathode rail in an arrangement such as by force of gravity, or via a "push connection", instead of using bolted or screwed connections. In response, the examiner does not find this argument persuasive because, as shown in figures 1-3 of Dastolfo, a cathode container (12) and a cathode connector (16) are in contact with each other without the need of bolted or screwed fittings (col. 4, lines 46-48). As shown in the figures, such arrangement is made by force of gravity, or via a "push connection".

### ***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ZULMARIAM MENDEZ whose telephone number is (571)272-9805. The examiner can normally be reached on Monday-Friday from 9am to 5pm.
8. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Harry D Wilkins, III/  
Primary Examiner, Art Unit 1795

/Z. M./  
Examiner, Art Unit 1795